



CGSIC

Industry Thoughts on PNT

J. Milton Vaughan
Precision Ag/DGPS Specialist

J. Milton Vaughan



Education:

B.S. and M.S. at North Carolina State University
Agronomy, Crop Science, and Plant Physiology

Experience:

Chemical Sales – Ciba/Geigy
Equipment Sales Manager - Johnson Manufacturing Company
Farming 17 years – No-Till - Row Crops and Small Grains.
Precision Ag Technology including AgLeader Yield Monitors -10 years

Trimble GPS Technology:

Sales, Support, Service, and Training – 9 years
Platinum Circle Award – 4th consecutive year

State and Professional:

President - North Carolina Small Grains Growers Association (1994)
Certified Crop Advisor (CCA- #21826)

Contact:

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Agrium Retail

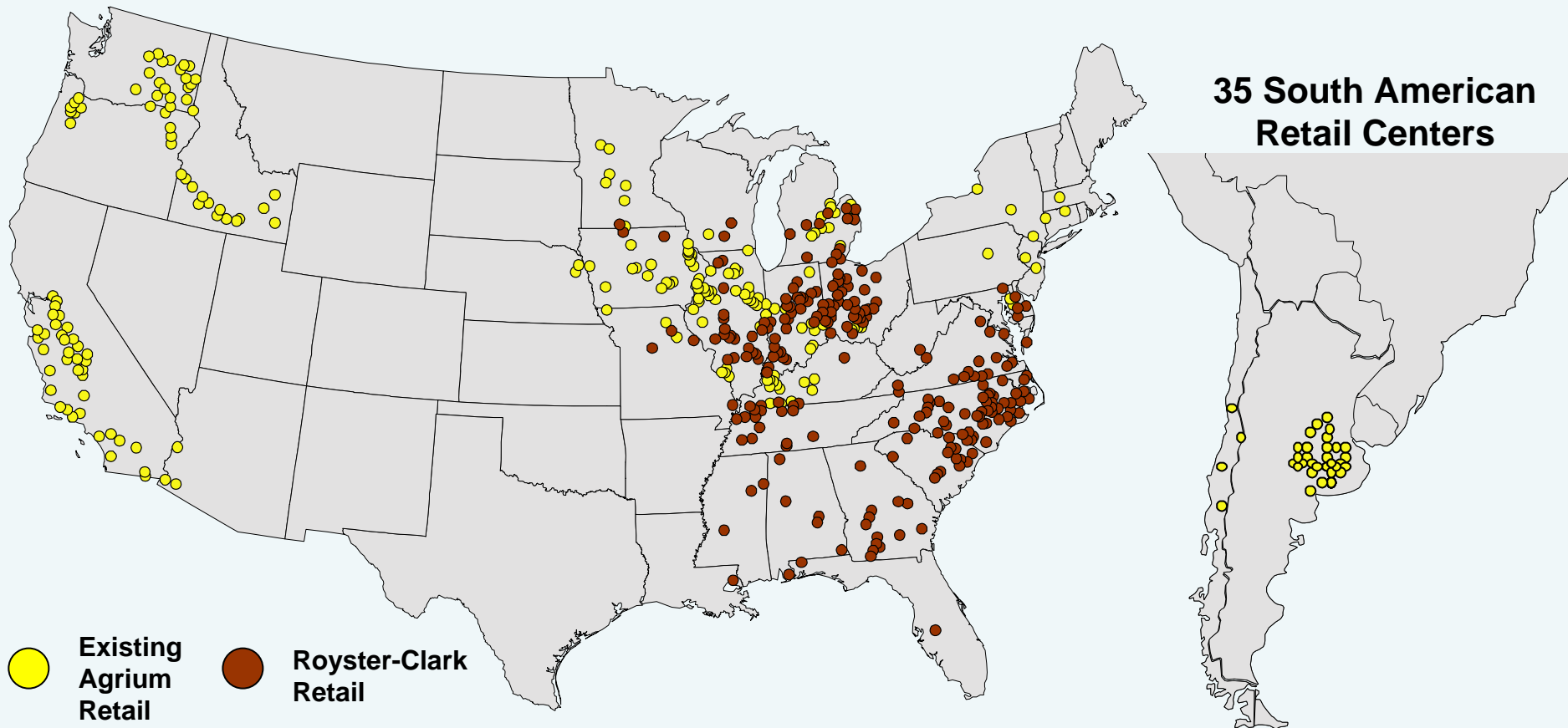
Agrium



Agrium is the largest North American agricultural retailer

Agrium & Royster-Clark Retail Centers

Approximately 500 retail centers globally



Crop Production Services cares...

It's our pledge!

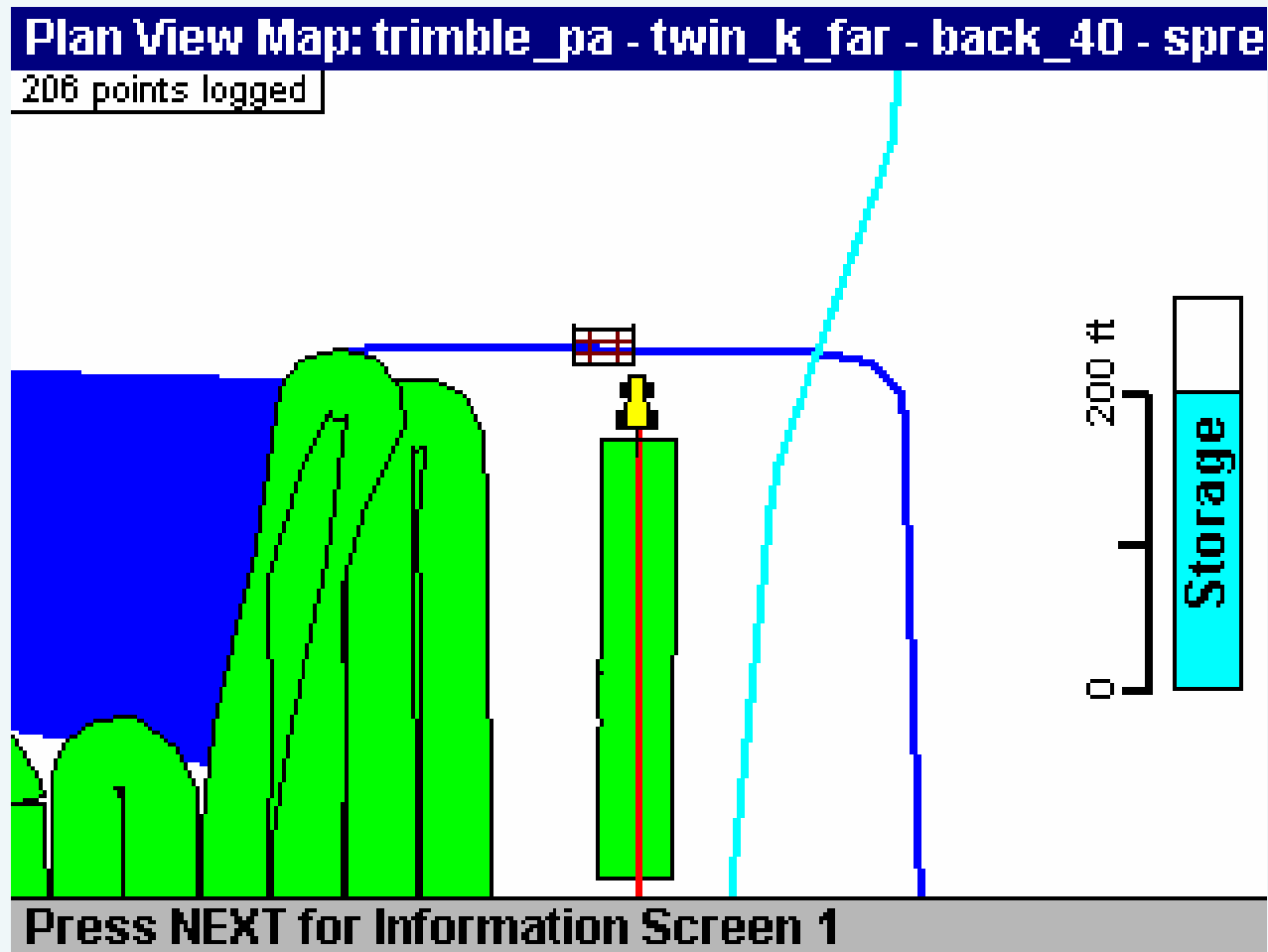
- **In 2006, Crop Production Services received:**
 - State National Environmental Respect Award; and
 - Region National Environmental Respect Award
- **In 2006, we became a certified partner in the U.S. Department of Homeland Security's "Customs-Trade Partnership Against Terrorism."**
- **We work with industry, researchers and growers to develop best management practices (BMPs) that promote environmental and economic sustainability**

Trimble AgGPS 132/332 DGPS Receiver

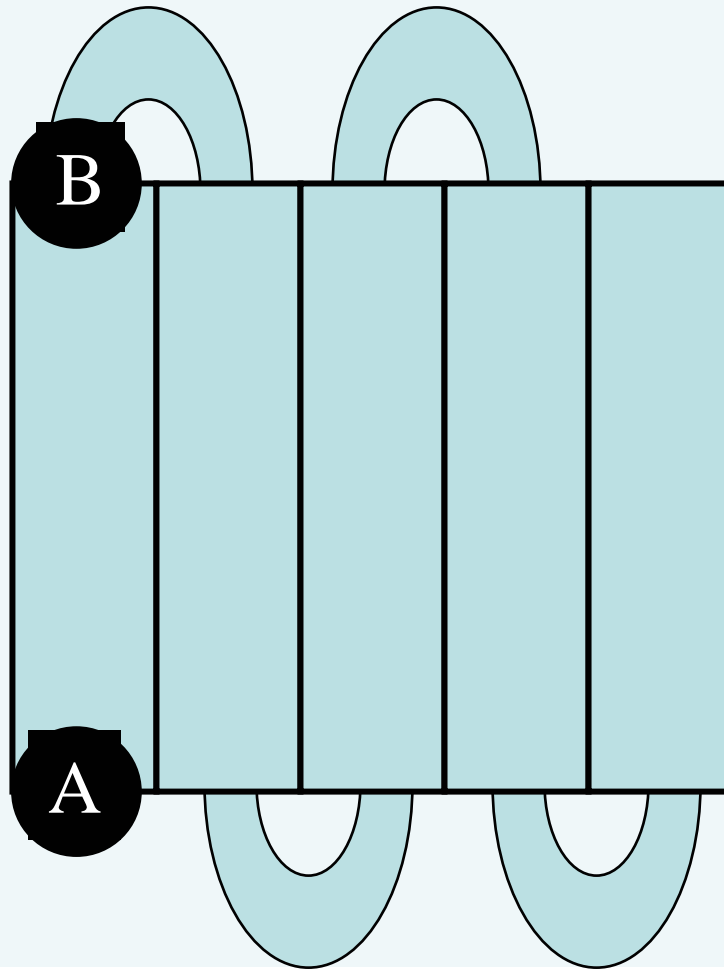
Trimble AgGPS 50 E-Z GUIDE Plus Lightbar



Guidance & Logging



Basic A-B



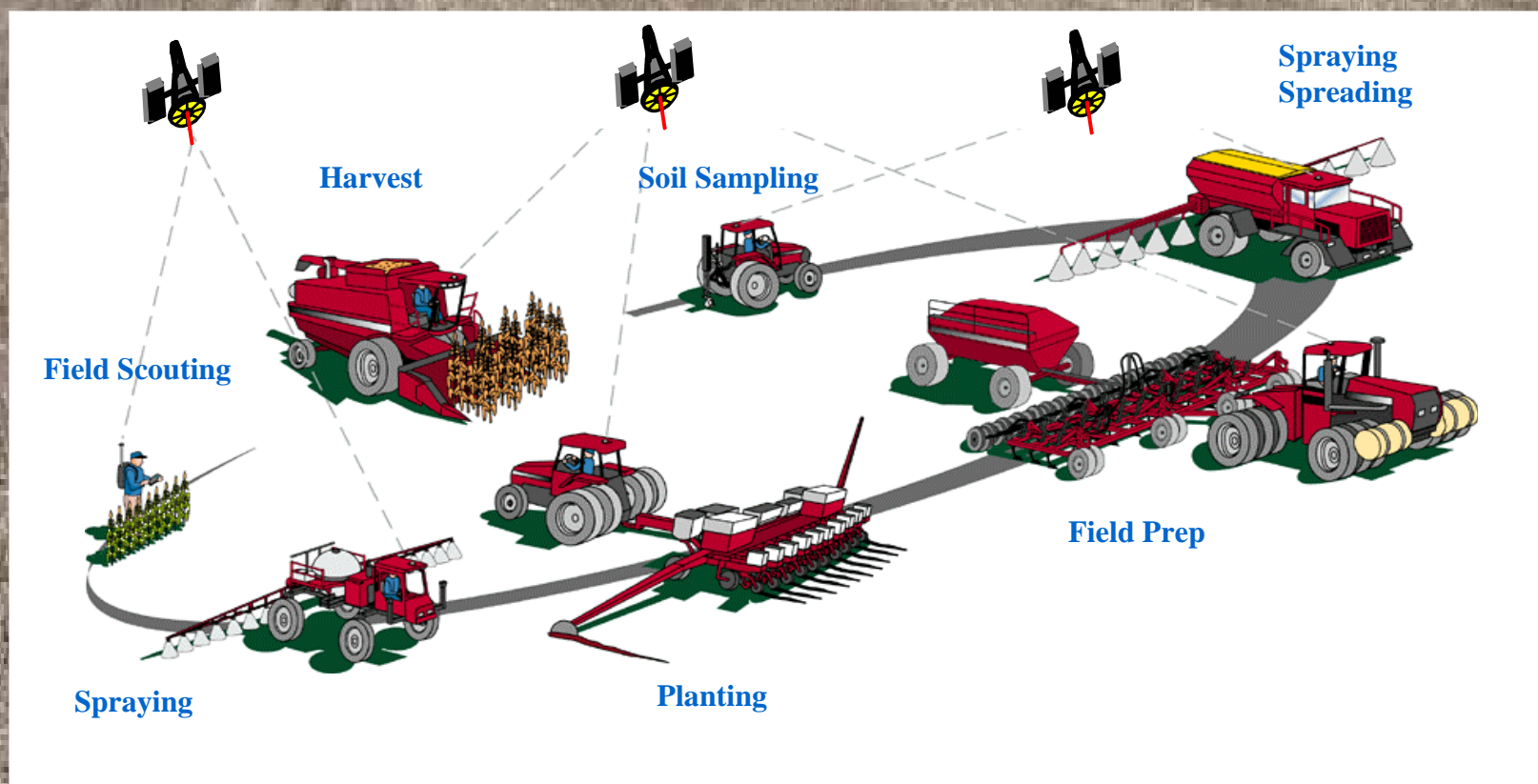
ECONOMICS OF LIGHTBARS

- **TIME SAVINGS**
- **EQUIPMENT AND GAS SAVINGS**
- **ADDITIONAL ACRES PER DAY COVERED**
- **MATERIAL SAVINGS -LIME, FERTILIZER & CHEMICALS**
- **DRIVER SICK - WHERE IS THE FIELD? OR FIELD NOT COMPLETE**



NDGPS Impact on U.S. Agriculture

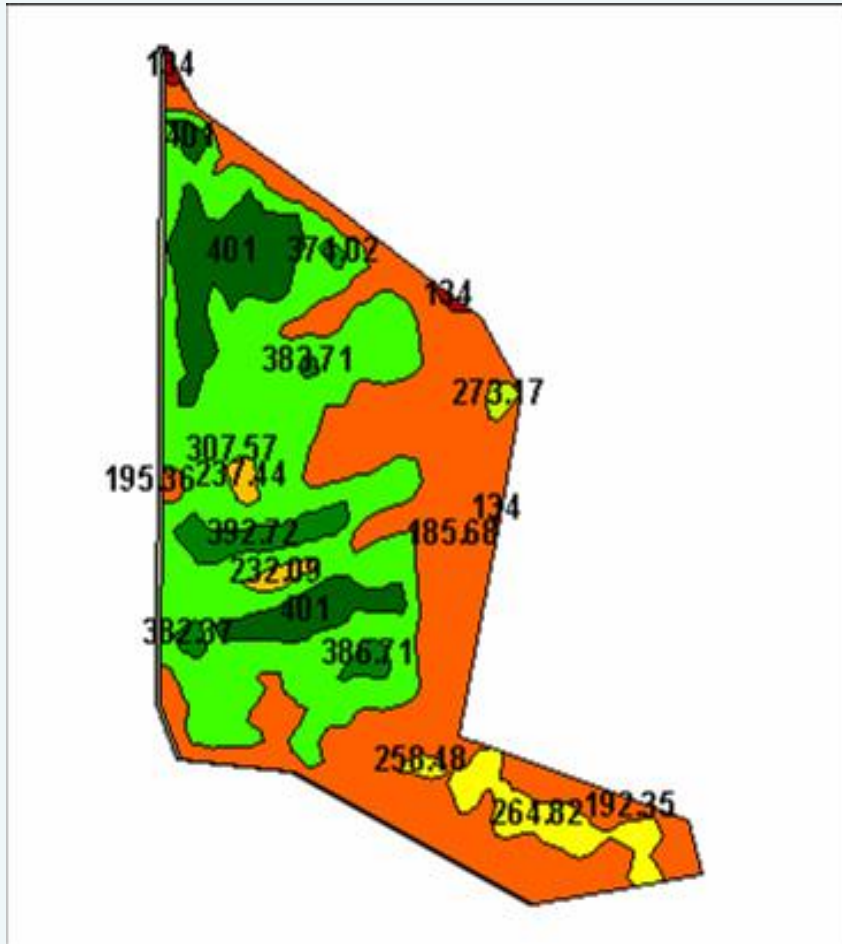
- U.S. farmers utilize NDGPS for agricultural operations throughout the entire growing season. NDGPS allow farmers to generate higher yields, lower input costs, and enable management practices that protect the environment.





Variable-Rate Applications

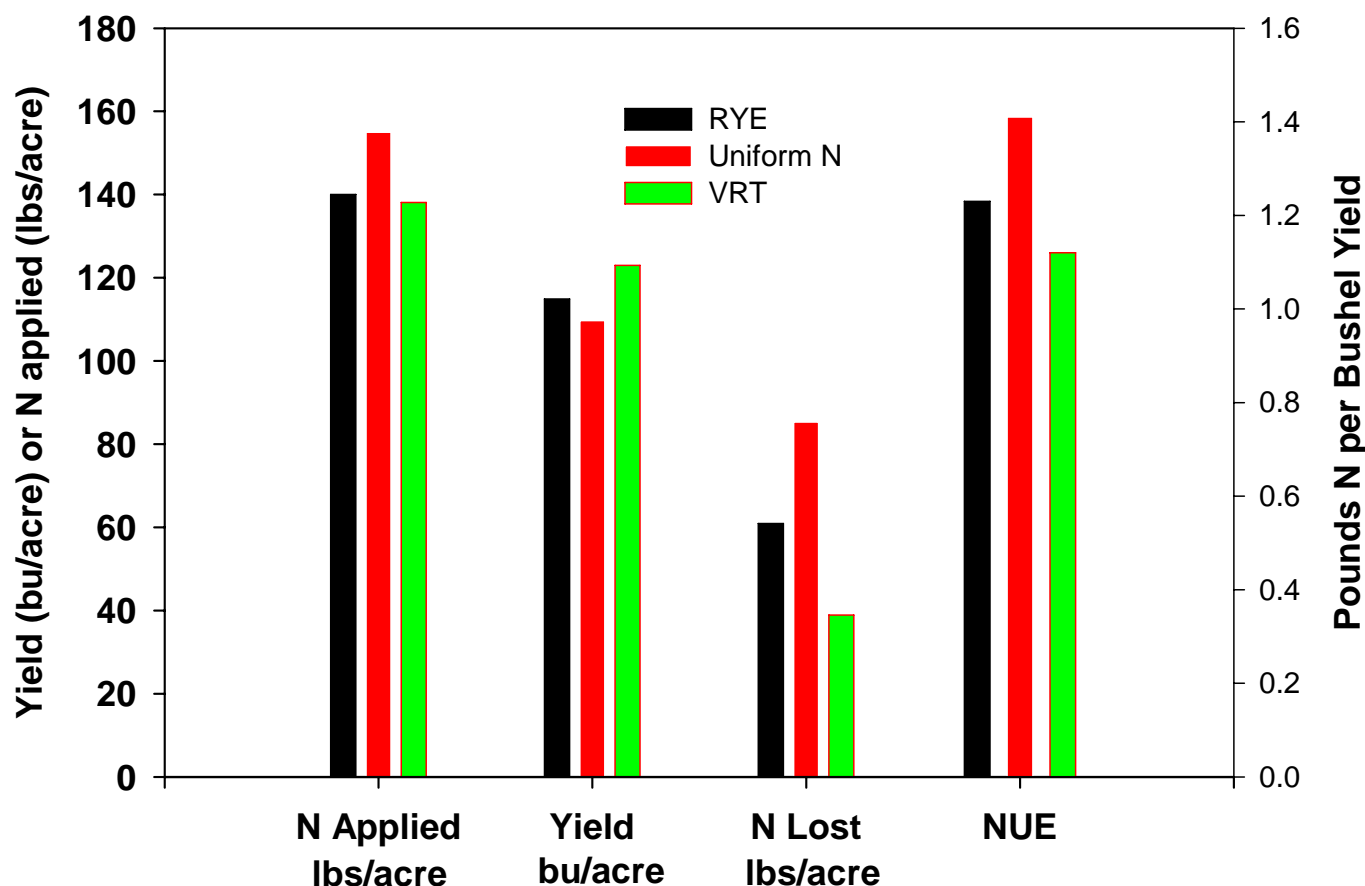
Prescription Map



- Map based variable rate controller uses DGPS to determine position, heading and ground speed
- Prescription map determines application rate for the field location.



Effect of Nitrogen Management Systems on Amount of Nitrogen Applied, Yield, and N Use Efficiency (2004)



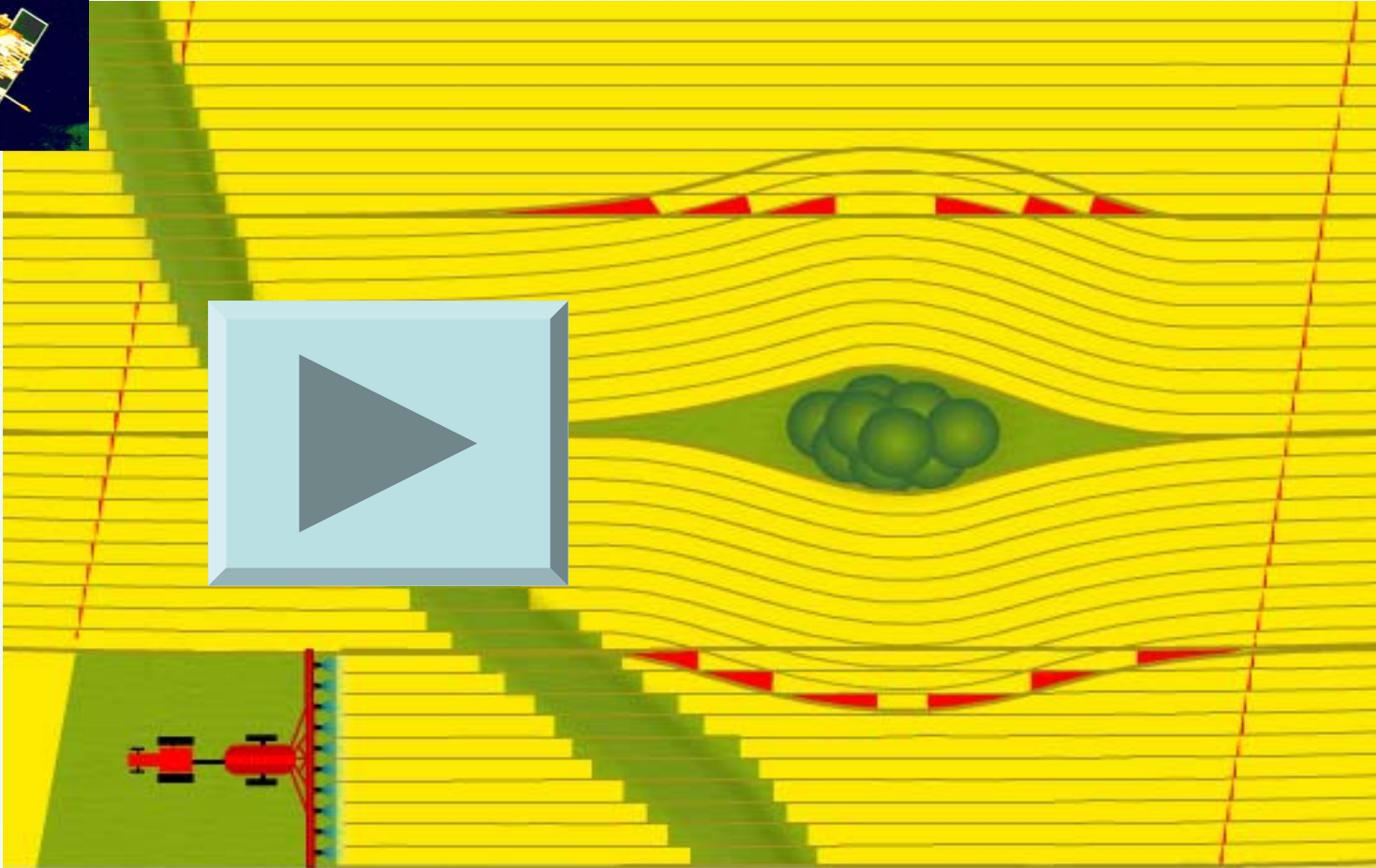
Saving Resources-Time and Fuel

- A study of 5000 acres across the southeast found that, on average, 15% of the area did not require P or K and that these areas were situated such that they could be avoided by the spreader.
- Current systems result in overlap resulting in 15% more area being covered and excess fertilizer applied.
- Eliminating these inefficiencies could reduce operator time by 1 hr and fuel use by 2 gal for each 50 acres covered.

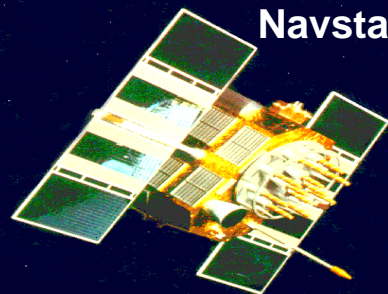




Capability of DGPS Boom Control



Global Positioning System



Navstar GPS Satellite

24 satellites in 6 orbits 10,900 nm

Errors in GPS

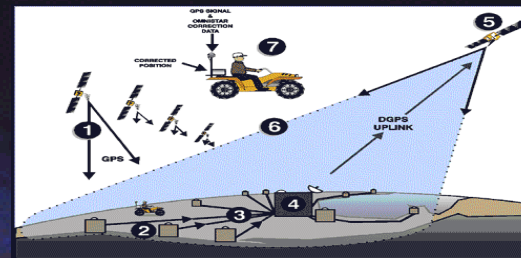
1. Orbital Errors - Ephemeris
2. Clock Errors
3. Atmospheric Errors
4. Multipath Errors

Correcting Error

- ✓ Ground stations monitor GPS satellites and determine positioning error – DIFFERENTIAL CORRECTIONS are then broadcast directly or via satellite link to a DGPS receiver to adjust the reported position
- ✓ To get the most accurate information 6-8 satellites are monitored and the “best” four used



Differential GPS



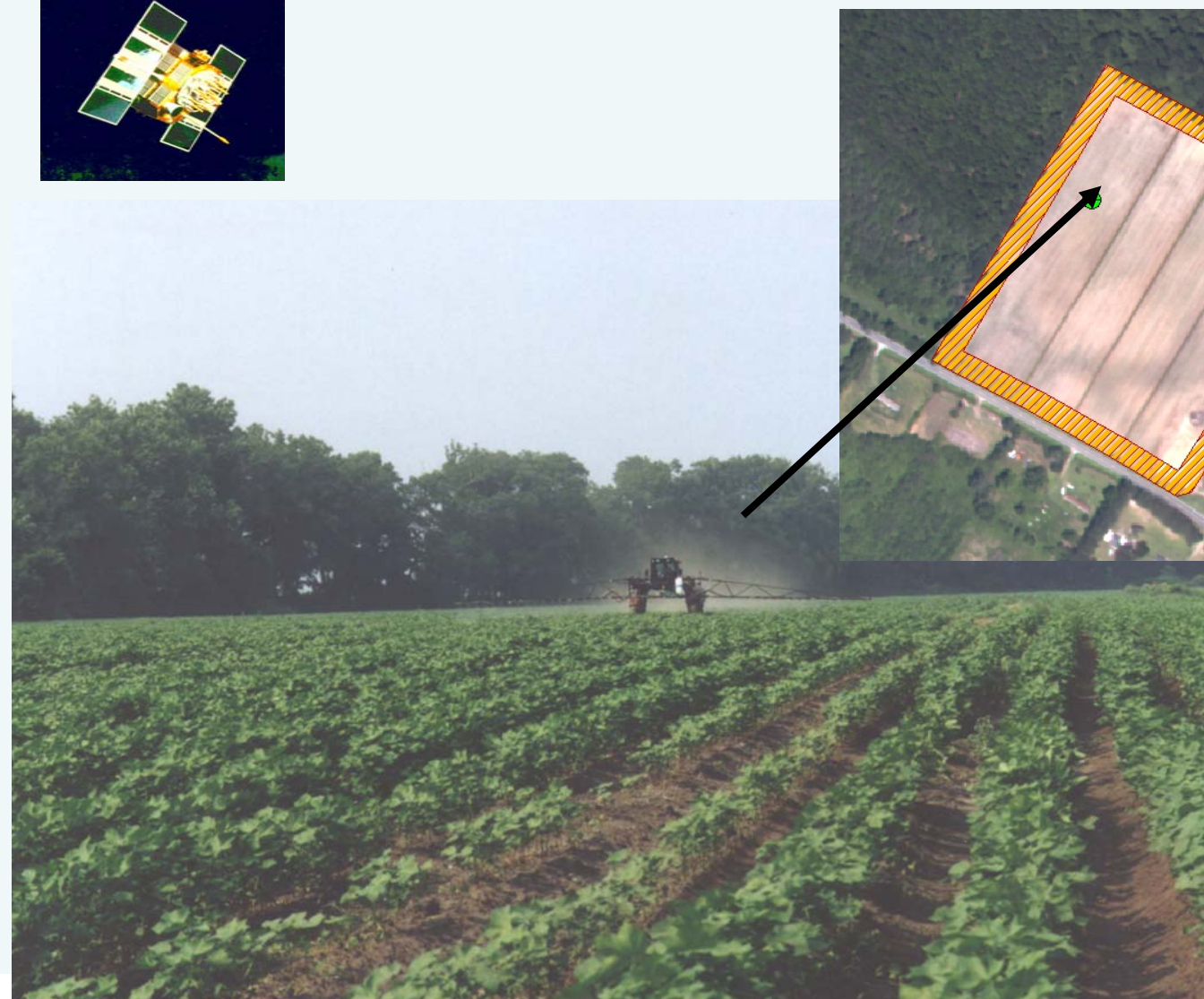
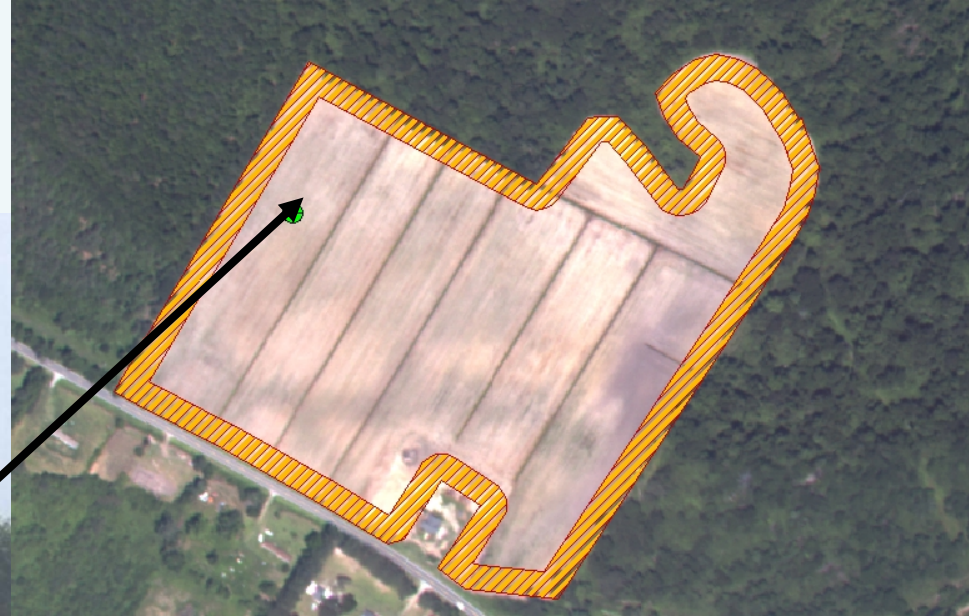
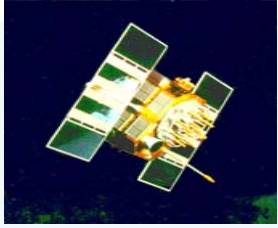
Sources for Differential Corrections in NC and VA

- ✓ Coast Guard AM Broadcast – New Bern, NC; Driver, VA; Kensington, SC; Greensboro, NC
- ✓ WAAS
- ✓ L Band satellite service - OmniSTAR; John Deere

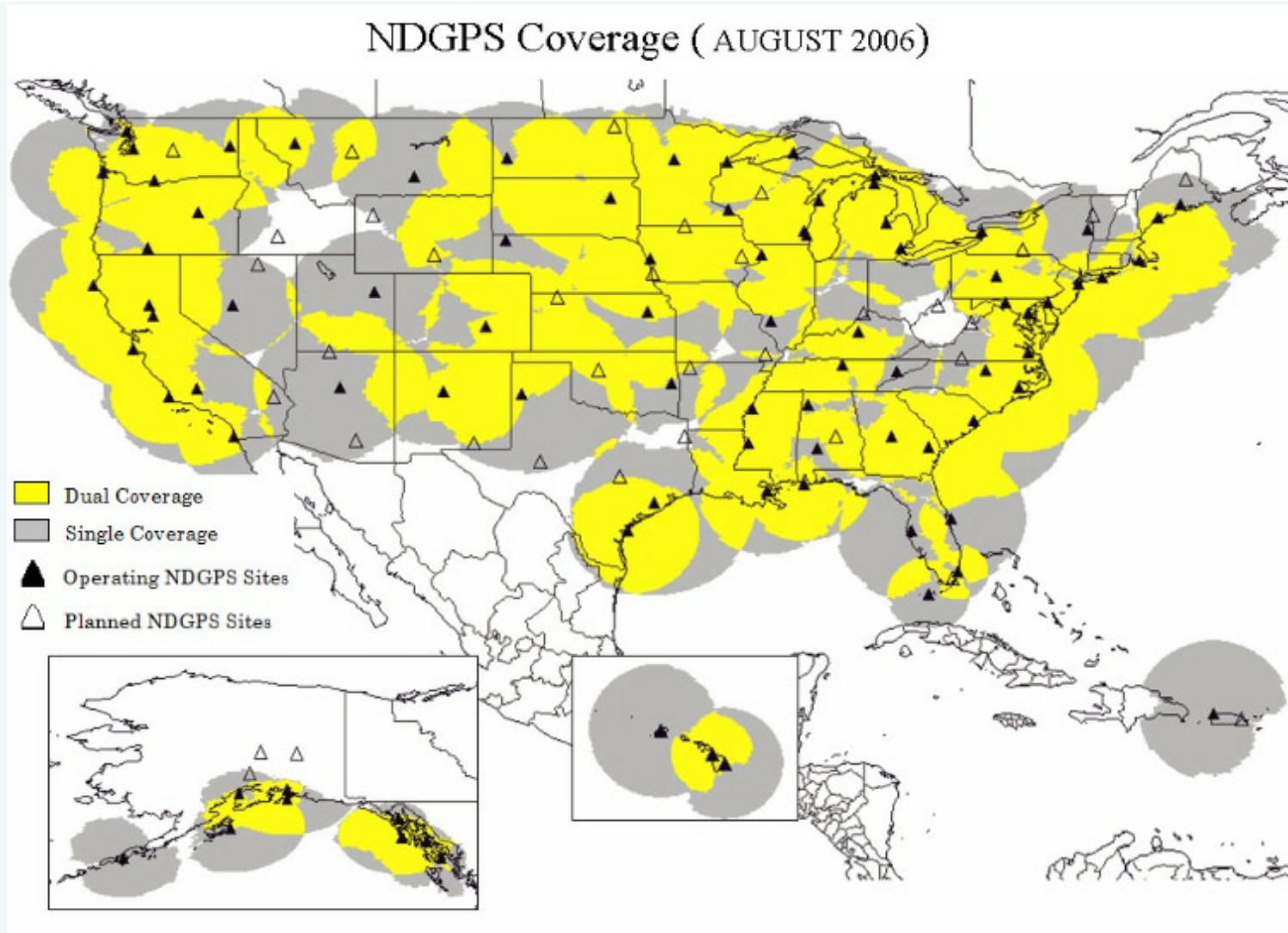
USCG Differential Advantages

- ✓ Doesn't require line of sight - wave travels between ground and ionosphere
- ✓ Not effected by plant canopy and can travel through glass, wood, and light steel
- ✓ No cost to user

Typical Field in North Carolina



NDPS Coverage



NDGPS

- **Extending Coastal
Differential GPS
Benefits to the
Nation's Heartland**

Cotton Yield Monitor





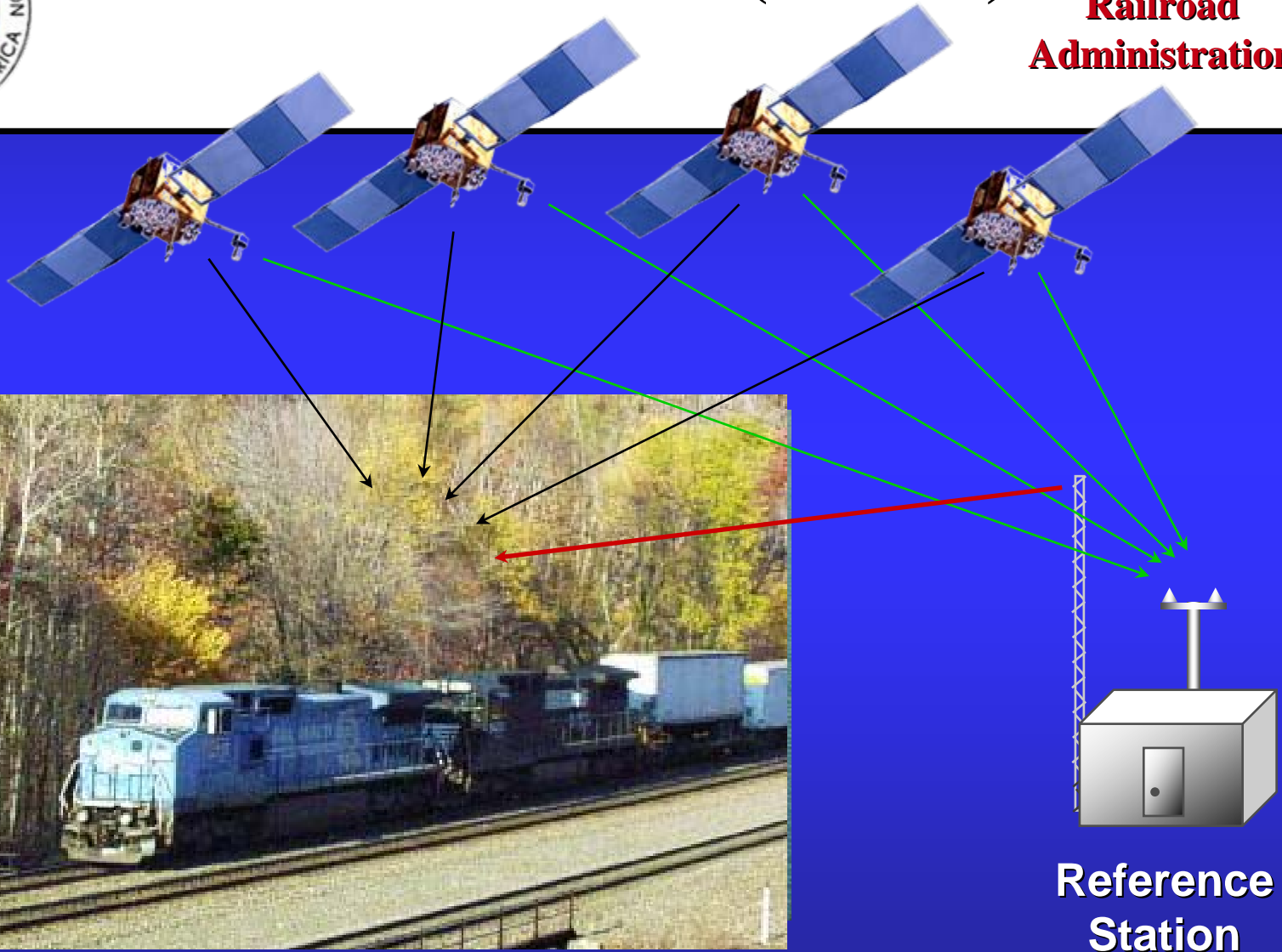






Differential GPS (DGPS)

**Federal
Railroad
Administration**





NDGPS Use in *Positive Train Control*

**Federal
Railroad
Administration**

- Provides Situational Awareness
- Prevents accidents, saving over \$60 million per year
- Reduces fuel consumption by better pacing trains
- Increases rail line capacity through closer train spacing, thus reducing the need for additional capital investment in plant and equipment.
- Independent estimates indicate that NDGPS used in a full PTC system will save the railroads and shippers between 2 to 4 billion dollars per year.

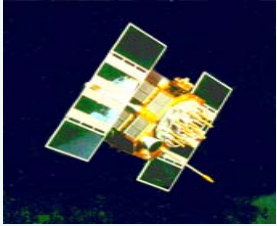


Virginia International Terminals Portsmouth, VA



Using DGPS from Driver, Virginia - USCG Beacon

Integration of NDGPS Throughout The United States



- Major cell phone providers are adapting DPGS for emergency services
- USCG Beacons are a superior source of correction in Urban landscapes





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Thank YOU for “YOUR TIME”

If I can Help —Please call

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